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UNITED STATES DEPARTMENT OF AGRICULTURE
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PREPARATION OF
SULFURED AND MARASCHINO CHERRIES

Sulfured Cherries

Sulfured cherries are prepared from properly ripened, stemmed or unstemmed, pitted or unpitted cherries, packed in a solution containing sulfur dioxide of sufficient strength to preserve the product, with or without the addition of sodium benzoate and/or hardening agents.

Standards for grades for pitted and unpitted sulfured cherries have been formulated by the Production and Marketing Administration of the U. S. Department of Agriculture.* These standards for grades are so framed as to exclude substances not mentioned in the text describing the grades, and imply that the product is sound and in compliance with the requirements of all applicable Federal and State Food and Drug laws and the regulations thereunder.

There are two types of sulfured cherries:

1. Unpitted sulfured cherries are those packed whole, with or without stems.
2. Pitted sulfured cherries are those from which the pits and stems have been removed.

Sizes of cherries. Standard sizes for grades of cherries used in sulfuring are:

Small	21/32" to 23/32"
Medium	23/32" to 25/32"
Large	over 25/32"

Varieties and harvesting. The Royal Anne cherry is the one most commonly used on the Pacific Coast for sulfuring. Its optimum maturity for harvesting is considered to be when the soluble solids lie between 16° and 20° Brix. Some workers recommend a total soluble solids content of 15 to 17 percent. The cherries should not have developed much pink color. Dark varieties such as Bing, Lambert, Deacon, Black Republican, and Black Tartarian are picked while still a light tomato color. Harvesting at proper maturity is particularly important with dark varieties since the deep colors of mature cherries make it difficult to obtain the desired uniform light shade in the finished product. Other white varieties may also be used.

To insure that the sulfured cherries conform to the standards for grades previously mentioned, it is necessary that the fruit be at optimum maturity and that care be taken in harvesting to obtain fruit free from bruises.

*Copies of these standards for grades may be obtained from the Fruit and Vegetable Branch, Production and Marketing Administration, U. S. Department of Agriculture, Washington 25, D. C.

Making the sulfurous acid solution. This solution can be made up in small lots by using a 52-gallon paraffin-lined fir or spruce barrel; if desired, large tanks holding about 500 gallons can be utilized.

The barrel or tank in which the solution is to be made is fitted at the bottom with coils of brass, lead, or copper tubing. Iron tubing should not be used, since it will cause discoloration. Holes about 1/16" in diameter, placed about a foot apart, are bored in the tubing. This is to permit escape of sulfur dioxide into the water covering the coils. A wooden lid floating on the water will tend to keep the bubbles of gas from bursting on the surface of the water, and thus reduce loss of gas.

Sulfur dioxide gas is purchased in cylinders. A cylinder is placed on a platform scale so that loss in weight of the cylinder can be observed as the gas is conducted through the coils in the barrel or tank. In this way the strength of the sulfurous acid solution can be calculated. It is preferable, however, to test the strength by well-known analytical methods. (e.g. See reference 3. p. 5.)

The strength of the sulfurous acid will vary from about 0.7 percent to 1.5 percent. In California the weaker solution is preferred, while in Oregon the more concentrated solution appears to be favored. If the solution is too strong for the particular fruit being sulfured, the cherries will crack during the first stages of treatment. If the solution is too weak, bleaching will be slow.

In general, a 1 percent sulfurous acid solution will be found satisfactory.

To every 100 gallons of 1 percent sulfurous acid solution, prepared as described above, should be added 5 pounds of calcium hydroxide or calcium carbonate (whiting). Only the purest grades of these chemicals should be used. The calcium hydroxide should be fresh so that air slaking will not have taken place. Calcium carbonate is preferable to calcium hydroxide because it is easier to handle and there is less danger of neutralizing the sulfurous acid. If there is not sufficient free sulfurous acid, the cherries will spoil.

The calcium hydroxide or calcium carbonate, when added to the sulfurous acid, forms calcium bisulfite, which is dissolved. A nearly clear solution will result.

Adding bleach solution to cherries. The washed cherries are put into a 52-gallon paraffin-lined fir or spruce barrel. Such a barrel will hold 250 pounds of fruit, and the weight should not exceed this because the cherries will expand when covered with the bleach.

After 250 pounds of fruit have been put into the 52-gallon barrel, the head is replaced and the bleach solution added through the bung. It will require about 25 gallons of bleach for every 240-250 pounds of cherries.

After adding the bleach and replacing the bung, the barrel should be upended to facilitate mixing.

The barrels should be stored on their sides in a cool place and watched constantly for a few days to see that the fruit is covered with the solution and that bleaching is progressing satisfactorily. It is also desirable to roll the barrels once a day for several days.

Curing. When properly cured, the cherries should be translucent and nearly white, or have a slight yellow tint.

Completeness of bleaching can be judged by breaking open several cherries to see if the fruit is bleached all the way through. Normally the cherries will be bleached in from 4 to 6 weeks.

Labeling. Interstate shipments of sulfured cherries must be labeled "Preserved with sulfur dioxide", to conform with the Federal Food, Drug and Cosmetic Act. If the cherries have also been preserved with sodium benzoate as well as with sulfur dioxide, the label must carry this information.

Many State regulations are similar to Federal regulations.

Maraschino Cherries

Maraschino cherries are used in foods, chiefly for decorative purposes. They are prepared from sulfured cherries by leaching out the sulfur dioxide and then dyeing with a certified color.

Removal of sulfur dioxide. If the cherries are to be used in canned products, such as canned fruit salads, the sulfur dioxide must be reduced to below 20 p.p.m.

The stemmed and pitted cherries are soaked from 24 to 48 hours in running water to remove most of the sulfur dioxide. Fresh water is introduced at the bottom of the soaking tank, permitted to flow up through the cherries, and then discharged at the top of the tank. The fruit is then boiled in several changes of water until it is tender and the sulfur dioxide is below 20 p.p.m.

In preparing cherries for use in cocktails, they are drained from the bleach solution and then washed. They may or may not be stemmed and pitted, depending upon the type of pack desired. Remaining sulfur dioxide is removed by slowly boiling for 2 hours, or until tender. The water should be changed about 4 times during this boiling.

Dyeing and siruping. Dissolve $5\frac{1}{2}$ pounds of sugar in 1 gallon of water. This will give about $1\frac{1}{2}$ gallons of a 40° Brix sirup. To this sirup add 1.3 grams (20.3 grains) of FD&C Red No. 1 (Ponceau 3R), 14 grams of sodium benzoate, and 33.5 grams of citric acid.

If larger quantities are desired, add to every 100 gallons of 40° Brix sirup 3 avoirdupois ounces of FD&C Red No. 1, 2 pounds sodium benzoate, and $4\frac{3}{4}$ pounds of citric acid.

Cover the fruit with this sirup mixture and bring to a boil. Set aside overnight. The next day add sufficient sugar to restore the Brix back to 40°. Bring to a boil and set aside for 24 hours.

Drain and replace with fresh 40° Brix sirup, to which has been added artificial maraschino flavor* to suit.

Packing. Heat the cherries in the fresh sirup to 175° F. and pack at this temperature into clean $\frac{1}{2}$ -pint jars. Seal and allow to cool in the air. The cherries in the jar should be completely covered with the hot sirup.

If sodium benzoate has been omitted, the sealed jars should be processed at 180° F. for 30 minutes.

The presence of artificial flavor, artificial color, citric acid, and sodium benzoate (if present) must be declared on the label.

Dyeing, and siruping with cherry sirup. In place of siruping with plain sirup, Lee and Beavens have worked out a method for siruping with cherry juice sirups. No artificial flavoring is needed. The cherry juices are prepared as follows:

Hot-pressed cherry juice: The fruit is first washed in dilute hydrochloric acid (1 quart of the concentrated acid to 16 gallons of water) to remove spray residue, and the acid is removed by washing in water. The washed fruit is stemmed and pitted, crushed and heated to 150° F. The fruit is then pressed in a hydraulic press, and the juice thus obtained is screened to remove coarse particles, heated to 185° F., and then cooled. The screened juice is clarified by adding a filtering medium (infusorial earth) and filtering in a plate and frame press. The Montmorency cherry is recommended for hot-press juice.

Cold-pressed juice is prepared from English Morello cherries by crushing the stemmed, pitted, and acid-washed fruit in a hydraulic press. The juice is screened, heated to about 130° F., and approximately 0.1 percent "Pectinol" added. The juice is allowed to stand at 130° F. for about 2 hours, subsequently heated to 180° F., cooled to about 100° F., and then filtered clear as described for hot-pressed juice.

Sugar is added to these juices to bring them to 65° Brix. Sodium benzoate in the amount of 0.1 percent is also added.

The Lee and Beavens method for preparing maraschino-type cherries, using the above juices, is as follows:

- (1) Remove sulfur dioxide as previously described.
- (2) Cover 100 pounds of fruit with a 1 percent solution of citric acid and hold at a temperature just below boiling for 15 minutes.

This may be purchased from any supply house dealing in true and artificial flavors.

- (3) Treat the drained fruit from (2) with a solution of 22.7 grams (350 grains) of FD&C No. 1 in 8 gallons of water and 25 pounds of sugar. Heat to 190° F. and then allow to stand 24 hours.
- (4) Add 25 pounds of sugar to the sirup of (3) and heat again to 190° F. Set aside for 24 hours.
- (5) Add 25 pounds of sugar to the sirup of (4) and heat again to 190° F. Set aside for 24 hours.
- (6) Drain off sirup. Pack cherries into clean 1/2-pint bottles. Fill the bottles with either of the following sirups, heated to 140° F. Then pasteurize the siruped bottles at 180° F. for 20 minutes.

Sirup a. Eight parts of hot-pressed 65° Brix Montmorency sirup and two parts of hot-pressed 65° Brix English Morello sirup.

Sirup b. Nine parts of cold-pressed 65° Brix Montmorency sirup and one part of cold-pressed 65° Brix English Morello sirup.

No artificial maraschino flavoring is needed.

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